

## **Granitic Rocks and Geologic History of the Idaho Batholith**

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You are each part of a larger research team investigating the Idaho Batholith. You are given a geologic map and you note that there are three different main categories of intrusions in the batholith, mostly based on age.

### **Regional Geology of the Idaho Batholith**

The Idaho batholith is primarily mesozonal granitic rocks of both Cretaceous and Tertiary age. The southern, and larger, portion of the batholith is defined as the Atlanta lobe (25,000 km<sup>2</sup>), whereas the northern portion is defined as the Bitterroot lobe (14,000 km<sup>2</sup>). The main phases of the Bitterroot lobe are thought to have intruded at depths of approximately 10 km or greater, based on metamorphic mineral assemblages in the country rocks and the presences of magmatic muscovite in the granites. Regionally metamorphosed (up to sillimanite grade) Precambrian Belt Supergroup sediments of the Salmon River arch separate the two lobes. Belt Supergroup rocks are also exposed north and east of the Bitterroot lobe and include sequences of metamorphosed siltstone, claystone, and sandstone. The majority of detrital zircons in the Belt rocks have ages of 1070-1860 Ma, constraining the depositional age to mid-Proterozoic.

Geochronological studies indicate that the Idaho batholith spans a significant range in ages (generally 100-54 Ma), and many of the mesozonal intrusions contain inherited zircons that indicate interaction with Proterozoic crust.

The boundary between Precambrian basement on the east side of the boundary and Triassic/Jurassic accreted terranes on the west has been termed the Salmon River suture zone.

### **Your assignment**

For your group, you have a suite of rocks that represent a coherent representation of part of the batholith. There are sample location numbers on the map that match the numbers on your rocks. Your job is to:

- a. Identify the minerals present in your suite of rocks (some are more unique than others),
- b. determine rock names
- c. determine if you have I-, S-, or A-type granites
- d. based on this determination, what might be a rough estimate of magma source, what, if any, assimilation occurred, and what a typical tectonic scenario may be for the formation of these rocks.
- e. determine what depth (relatively) in the crust that your rocks were intruded, and provide evidence for this estimation.
- f. Also see (and describe) if your rocks have any distinctive textures to them that might help you figure out a relative history of the batholith.

At the beginning of lab tomorrow all groups will report their findings. Remember each suite represents a similar, but slightly different, history so the key will be to relate suite 1, 2, and 3 and not so much the geographic distribution of them.

Based on the three groups findings, what sort of history can you put together for the batholith, both igneous and tectonic? Write up a 1-2 page history of the batholith based on the entire class' findings.

**Suite 1 (50-42 Ma)**

98IB-19, 98IB-18, 98IB-21, 98IB-57

These plutons have also been the source of moderate size fluorite mine operations.

**Suite 2 (75-65 Ma)**

98IB-67, 98IB-39, 98IB-10 , 98IB-11

**Suite 3 (75-65 Ma)**

**The zircons have cores of Proterozoic age approximately 1,750-1,800 Ma**

98IB-40, 98IB-36, 98IB-12

